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...TC Notes.... Special Edition



Science Knows No Boundaries

The Office of Science and Technology Policy and the Office of the Science and Technology Adviser to the Secretary of State have been working with many public organizations to develop and publicize outreach activities for this very special week.

During this time, the United States is hosting the Intel International Science and Engineering Fair, bringing together more than 1,200 high school students from 40 nations for a prestigious international science competition. All these activities highlight the international nature of science and underscore the importance of math and science education in today's era of globalization.

Science in agriculture encompasses the food and fiber system that is meant to feed and clothe every person on this vast planet. The need for young people to broaden their image of agriculture as strictly farming and to realize the importance math and science play in today's agriculture has never been greater.

This issue of Agriculture in the Classroom A/TC Notes is devoted to bringing to teachers and students programs and teaching aids aimed not only at educating our youth about the many faces of agriculture, but that do so in ways that strengthen and sharpen math,

science, and other important learning skills. We have pulled these resources from our own state programs and from other organizations with the same goals as USDA's Cooperative State Research, Education, and Extension Service—to increase information and education for tomorrow's world citizens.

Boundless Science Bountiful Agriculture

Providing food for six billion people daily is no small task, and science and technology play a huge role every step of the way. From food production to processing, to distribution, nutrition and food preparation, science and technology are ever present. For example, it is only through the study of biology and life sciences that we have an understanding of the needs of plants and animals. From this research, we can produce healthier plants and animals, which become our food and make healthier people. The study of ecology has provided us with a better understanding of natural ecosystems and the complex interplay between the living and physical environment. These understandings help make our agricultural systems more sustainable and work with nature. Understanding pathogens and how to prevent them has led to a safer and healthier food supply, and has decreased death

and illness throughout the world. Transportation technologies, including refrigeration and controlled environments, allow a diversity and abundance of food and agricultural products to move globally.

When we are enjoying a meal, we usually don't think about the science and technology that is behind the scenes. We most likely think about the appearance, taste, and smell of the food. We may even just focus on the conversation, and take the meal for granted. Science and technology pervades our lives no where more than in agriculture and the food system. Food science research and development has provided us with everything from seedless grapes to frozen foods and from chocolate bars to low-fat cheese. Plant breeding has led to commercial plant varieties that are high yielding and more resistant to pests and diseases. Nutritional sciences have provided us with ways of determining a healthy balanced diet to meet our needs.

Although science and technology information is globally available and transferable, there are many rules, regulations, and cultural norms that can limit the opportunity to apply science and technology. This has led to an uneven application of science and technology innovations from country to country. So although it is said that "science can feed the world," it is the social, cultural,

infrastructure, and government systems in a country that are instrumental in food availability and distribution. Social, moral, and ethical questions are always present when we use new scientific discoveries or apply new technologies. This is of course true with food and agriculture.

Scientists are continuously needed to solve problems related to food and agriculture throughout the world. There are many existing and emerging career opportunities for scientists such as biochemists, nutritionists, agronomists, entomologists, pathologists, toxicologists, animal scientists, physiologists, microbiologists, environmental engineers, and many others. Often professional jobs in agriculture go unfilled because there are not enough people who understand agriculture and the food system and the science and technology involved. We need to encourage our young people to understand the opportunities in the agriculture and food system.

Next time you enjoy a meal, remember all the science and technology that went into producing your food and getting it to your table.



Heroes In Ag Science

Dr. Norman Borlaug

Who has saved more human lives than anyone else in history? Who won the Nobel Peace Prize in 1970? Who also won the Medal of Freedom and more than 35 honorary Doctorate Degrees? Who still teaches at Texas A&M at the age of 86? The answer: Norman Borlaug.

Though barely known in the country of his birth, elsewhere in the world, Norman Borlaug is widely considered to be among the leading Americans of our age. For over a half century, Borlaug's scientific and humanitarian achievements have kept starvation at bay for people in third-world countries.

He received the Nobel in 1970 for his work in reversing the food shortages that haunted India and Pakistan in the 1960s. Perhaps more than anyone else, Borlaug is responsible for the fact that throughout the postwar era, except in sub-Saharan Africa, global food production has expanded faster than the human population, averting widely predicted mass starvation—for example, that forecast in the 1967 best-seller, *"Famine-1975!"*

Because of Borlaug's efforts to increase food production while reducing the amount of land needed to grow the crops, millions of lives have been saved in countries whose farming methods were forever changed by his research and teaching. It is estimated that his contributions have prevented a billion deaths.

For more information on this fascinating agricultural hero, visit the Norman Borlaug Heritage Foundation at <http://www.normanborlaug.org>

USDA Foreign Agricultural Service and AITC Seek to Join Forces

U.S. Department of Agriculture leaders, past and present, often stress that the role agriculture plays in the realm of science and technology is of the utmost importance. This role is to produce food, fiber, and related products for a growing world population. By the time current pre-K students enter the work

force, the world population will be approaching 10 billion.

However, it has been difficult to foster interest in ag science and technology in urban settings, especially those populated by minority or low-income groups. To address this educational shortfall, USDA's Foreign Agricultural Service's Office of International Cooperation and Development and Ag in the Classroom (AITC) are collaborating on an ICD program, "Teaching Educators Agriculture and Conservation Holistically for Urban Society" (TEACH US). The TEACH US outreach program will give traditionally under-represented people greater knowledge of food and agricultural science and research activities, and will showcase opportunities in these arenas in the United States and worldwide.

Expanding a Pilot Project

TEACH US builds on an existing pilot project in Washington, D.C. and Africa, where teams of specially selected urban teachers are sent as ambassadors to TEACH US International Institutes. The urban focus springs from concerns that food and agricultural sciences are not often understood by or taught to the under-represented, especially those in urban settings. To some urban educators and administrators, food and agricultural science programs may be seen as impractical and are rarely sought after or taught. Thus, many minority youth have negative perceptions of agriculture and related subjects.

Teachers Enthusiastic

In 1999, eleven elementary school teachers from the District of Columbia traveled to South Africa where they worked side-by-side with local teachers and scientists to update a historic plant survey. In 2000, three

teams of teachers from the District of Columbia and the surrounding metro area traveled to South Africa and Costa Rica on expeditions, and to California for training.

Teachers return to their schools enthusiastic about teaching and about agriculture, filled with new knowledge, information, and experiences.

What's Next?

In 2001, three teams will travel to Europe, Asia, and Africa with teachers from the District of Columbia, New York, and other cities. More urban centers will send teachers on TEACH US expeditions to every continent. To be eligible for TEACH US Expeditions, teachers must participate in Agriculture in the Classroom or other comparable agricultural literacy training. This gives the teacher international agricultural experience. Each TEACH US Expedition gives teachers hands-on, inquiry-based learning opportunities directed by leading agriculture and natural resource experts from the United States and host countries.

The Future of Ag Science

A groundwork of agricultural literacy and agricultural research and science awareness in young children helps ensure that enrollments in agricultural science programs will increase. These future food and agricultural scientists will be prepared to work together to further scientific discoveries and to tackle issues of common global concern—hunger, poverty, disease, environmental degradation, and sustainable energy production.

Farm Facts Plant Many Skills

While students in grades 4-6 and 7-12 are learning all about farming, they learn a lot more!



The American Farm Bureau's Foundation for Agriculture has produced comprehensive booklets and lesson plans for each of these grade groupings that not only teach about farming and its many elements, but also hone student academic skills.

Each 26-page booklet features beautifully designed, four-color graphics and tables presenting facts about today's agricultural production, food consumption, and international trade, historical highlights, and a glossary. A poster insert illustrating state commodities and national rankings is also included.

Skill-Building Incorporated

The elementary-level set targets skill-building in math, social science, language arts and study habits.

Junior high and high school materials guide older students from agricultural productivity, consumer economics, international trade, and farm-related government programs to modern farming techniques and agribusiness, including technology uses, global trade, and environmental impacts. Using charts, percentages, quizzes, and other methodology helps students sharpen various skills while learning that there is more to American agriculture than growing crops.

Great For Teachers, Too

Lesson plans are designed for use with the Farm Facts

booklet. The lesson plan folder includes student work sheets and answer sheets. Sets of overheads for use with the units are also available.

MN AITC Asks Kids: Where in the World?

Minnesota's Ag in the Classroom Program has created *AgMag*, a wealth of agricultural information for fourth-, fifth-, and sixth-graders, which is published three times each school year. Volume 15, Issue 2 (2000/2001) contains an excellent exercise on global agriculture entitled "Where in the World?". A two-color world map contains blank "buttons" with 12 questions for students to match numbers to correct countries. Turn to Page 4 to see if you can identify the countries without the map!

Much Information, No Cost

Although *AgMag*'s contents are geared toward Minnesota agriculture, there is much good information in every issue that can readily be adapted by teachers to other localities, especially those in the North Central states, should you wish to subscribe to this free tool. Each issue also contains a teacher guide.

Back issues are available in limited numbers, on a first-come, first-served basis. For subscription or back issue information, contact **Alan Withers**, Minnesota AITC, at Alan.Withers@state.mn.us. You will also want to check out the Minnesota AITC web site at www.mda.state.mn.us/maitc, or www.agclassroom.org/MN. This site also contains 19 plant and animal commodity cards and Ag~tivity Books for lower and upper grades. All are in PDF format for printing.

WHERE IN THE WORLD?

1. The largest country in South America sends us coffee and cocoa.
2. Our neighbor to the north, this country is #1 among all nations in buying from Minnesota, buying one-fourth of that state's exports.
3. This Asian country has been changing from a communist style of doing business to one that gives people more choices. There are more people to feed here than anywhere else in the world. They grow rice, tea and cotton.
4. This Central American country sends us things most states can't grow for ourselves, such as bananas, cane sugar and coffee.
5. We enjoy cheeses like Edam and Gouda, named for towns in this small European country.
6. This fast-growing market for U.S. products is our neighbor south of the Rio Grande. Only Canada and Japan buy more products from Minnesota's food producers than this country does.
7. One of our own territories, this Caribbean island sends the U.S. a whopping 88% of its exports. Pineapples, plantains, bananas and coffee are some of them.
8. This Eastern European republic is the most important agricultural producers of the former Soviet Union. It leads the world in sugarbeet production.
9. This Mediterranean nation exports olives, sugarbeets and citrus fruits. Its name is the same as one of the U.S.'s exports!
10. We can thank this South Pacific island nation for introducing us to kiwi fruit. The people who live there even call themselves kiwis. Wool is an important export here.
11. This Asian nation, built on many islands, is our country's biggest customer for agricultural products. We buy a lot from them too, but it's mainly cars, computers and other electronic products.
12. This South Pacific continent and country exports meat, wool and wheat.



ANSWERS:
1. Brazil
2. Canada
3. China
4. Costa Rica
5. Netherlands
6. Mexico
7. Puerto Rico
8. Ukraine
9. Turkey
10. New Zealand
11. Japan
12. Australia



Ag in the Classroom

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